Ircelyon
INSTITUT DE RECHERCHES
SUR LA CATALYSE
ET L'ENVIRONNEMENT

# Postdoctoral position on Catalytic Recycling of Silicones

In the silicone value chain, from quartz to silicon then chlorosilane intermediates to silicone materials, the carbon impact of the upstream steps (silicon and intermediates) accounts for around 75% of emissions. An appealing recycling route consists of transforming waste silicone-based materials back to chlorosilanes. The direct cleavage of Si-O bond to form back Si-Cl is however very challenging. An indirect pathway has been elegantly discovered using $BCl_3$ as an inorganic source of chloride as recently published in Science. Nevertheless, this low temperature (< 60°C) catalytic route has a number of drawbacks (economical viability, access to $BCl_3$, additional recycling loop of boron,...).

The CARES project funded by the French National Research Agency (ANR) proposes to address the much more challenging direct cleavage of Si-O bond to form back Si-Cl using all-silicon pathways (via $SiCl_4$ and $MeSiCl_3$ as chloride source). To face this significant reactivity challenge, the use of catalysis is mandatory and the CARES project brings two academic laboratory CP2M and IRCELYON with complementary expertise in homogenous and heterogeneous catalysis and an industrial company, Elkem covering the complete value chain from quartz to silicone materials.

This postdoctoral position in the CATREN team of IRCELYON will focus on preparation of strong Lewis acidic supported catalysts, their evaluations for the conversion of either model compounds in gas phase and of different silicone materials. The fresh and used catalysts will be characterized by different techniques available at IRCELYON.

**Requirement**:

- Doctorate in chemistry preferably with heterogeneous catalysis as specialty

**Skills**:

- Experience in preparation, characterization and testing of heterogeneous catalysts
- Knowledge of catalytic reactors and GC analytical tools
- Knowledge of polymer materials, of silicon reactivity

**Net salary**: ~35 k€/y for candidate with 2 years of postdoctoral experience

**Duration**: 18 months

**Location**: Prettre Building, 2 Av. A. Einstein 69626 Villeurbanne

**Starting date**: January 2026

**To apply**: send CV, motivation and recommendation letters to Dr Stéphane Loridant and Dr Dorothée Laurenti.

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